

FORM PTO-1390 (Modified)
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

R.35956

DESIGNATED/ELECTED OFFICE (DO/EO/US)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

CONCERNING A FILING UNDER 35 U.S.C. 371

09/914566

INTERNATIONAL APPLICATION NO.

PCT/DE 00/04099

INTERNATIONAL FILING DATE

21 November 2000

PRIORITY DATE CLAIMED

31 December 1999

TITLE OF INVENTION

Contact Protection Housing, Injection Pump, and Method For Mounting A Contact Protection
Housing With The Aid Of An Adapter

APPLICANT(S) FOR DO/EO/US

NIESLONY, Markus

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

Transmittal Sheets in duplicate w/fees charged to Dep.Acct. 07-2100
 Copy of German Text Application w/2 sheets drawings
 Translation of German Text Application w/2 sheets drawings
 Preliminary Amendment
 Executed Declaration (not enclosed)
 Assignment to Robert Bosch GmbH (not enclosed)
 Copy of PCT/RO/101
 Copy of PCT/ISA/210, 220

09/914566 "16301

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Nieslony Markus

Based on PCT/DE 00/04099

For: Contact Protection Housing, Injection Pump, And Method For Mounting A
Contact Protection Housing With The Aid Of An Adapter

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Replace in their entirety pages 1, 2, 3, 5, 6, 7, 10 and 13, with new pages
1, 2, 3, 5, 6, 7, 10 and 13, attached hereto as Appendix 2.

Page 11, line 1, delete "Claims" and insert --I Claim--.

IN THE CLAIMS

Please cancel claims 1-7 and add new claims 8-15.

8. A contact protection housing for at least one electrical terminal that is disposed in
a housing part (7) which is mounted on a component (1) and in which an opening (8)
for introducing potting composition is made, said housing part comprising a thin-
walled cap (7), whose edge rests constantly on the component (1) by initial tension.

9. The contact protection housing of claim 8, wherein said cap (7) is in the form of a cylinder (20), open on one face end, on whose jacket face a protrusion tapering to a sharp point is provided, the flanks (21, 22) of which protrusion are embodied as slightly concave.

10. A fuel distributor injection pump for motor vehicles, on which pump a magnet valve (1) is secured with the aid of a hollow clamping screw, said pump comprising a contact protection housing at least one electrical terminal that is disposed in a housing part (7) mounted on said magnet valve (1) and in which an opening (8) for introducing potting composition is made, said housing part being formed by a thin-walled cap (7), whose edge rests constantly on said magnet valve (1) by initial tension, said cap (7) being in the form of a cylinder (20), open on one face end, on whose jacket face a protrusion tapering to a sharp point is provided, the flanks (21, 22) of which protruding are embodied as slightly concave, said contact protection housing protrusion protruding past the inside diameter of said hollow clamping screw.

11. A method for mounting a contact protection housing for at least one electrical terminal that is disposed in a housing part (7) which is mounted on a component (1) and in which an opening (8) for introducing potting composition is made, said housing part having a thin-walled cap (7), whose edge rests constantly on the component (1) by initial tension said method comprising introducing said potting composition is introduced with the aid of a nozzle (10) an adapter (14) disposed between the cap (7) and the nozzle (10).

12. An adapter for the use of the method of claim 11, wherein said adapter (14) has a through bore with a first portion (11), whose diameter is larger than the diameter of the opening (8) in the cap (7) for introducing the potting composition, and having a conical second portion (12), which tapers from the inside outward.

13. The adapter of claim 12, wherein first portion (11) of said adapter tapers from the inside outward.

14. The adapter of claim 12, wherein said adapter further comprising a cylindrical third portion (13) disposed between the first portion (11) and the second portion (12).

15. The adapter of claim 13, wherein said adapter further comprising a cylindrical third portion (13) disposed between the first portion (11) and the second portion (12).

Appendix 1, changes to the specification indicated with brackets and underlining:

Page 1, of the specification:

CONTACT PROTECTION HOUSING, INJECTION PUMP, AND METHOD FOR
MOUNTING A CONTACT PROTECTION HOUSING WITH THE AID OF AN
ADAPTER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a 35 USC 371 application of PCT/DE 00/04099 filed on
November 21, 2000.

BACKGROUND OF THE INVENTION

[Prior Art] Field of the Invention

The invention relates to a contact protection housing for at least one electrical terminal that is disposed in a housing part which is mounted on a component and in which an opening for introducing potting composition is made. The invention also relates to an injection pump, having a contact protection housing as described above. The invention also relates to a method for mounting a contact protection housing, with an adapter.

DESCRIPTION OF THE PRIOR ART

[From] German Patent Disclosure DE 197 03 686[,] discloses a contact protection housing [is known] which comprises two [put-together] assembled housing parts. There is a seal between the two housing parts. The seal holds back

potting composition that has not yet set during filling. The seal must be positioned precisely when the contact protection housing is put together. Furthermore, the seal is vulnerable to wear.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to furnish a contact protection housing which is formed of fewer individual parts than conventional contact protection housings. The effort and expense of assembly should also be reduced.

Page 2, of the specification:

In a contact protection housing for at least one electrical terminal that is disposed in a housing part which is mounted on a component and in which an opening for introducing potting composition is made, this object is attained in that the housing part is formed by a thin-walled cap, whose edge rests constantly on the component by initial tension. This offers the advantage that the seal required in conventional contact protection housings can be omitted.

[Advantages of the Invention]

[This offers the advantage that the seal required in conventional contact protection housings can be omitted.]

A particular [type of] embodiment of the contact protection housing of the

invention is characterized in that the cap takes the form of a cylinder, open on one face end, on whose jacket face a protrusion tapering to a sharp point is provided, the flanks of which protrusion are embodied as slightly concave. The concave embodiment brings about an elastic adaptation of the flanks of the cap to the component. As a result, production-dictated tolerances of the component can be compensated for. Venting the cavity during the potting takes place automatically via the remaining slight gaps between the line holder and [the] a magnet valve with which it is used.

Page 3, of the specification:

above-stated objected is attained by a contact protection housing [of claim 2,] whose protrusion protrudes past the circumference or inside diameter of the hollow clamping screw. As a result, in the mounted state, an undesired dismantling of the magnet valve is reliably prevented.

Page 5, of the specification:

depends, among other factors, on the temperature of the nozzle in the introduction process.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages, characteristics and details of the invention will become apparent from the ensuing description, [in which one exemplary embodiment of the invention is described in detail] in conjunction with the [drawing]. The characteristics

recited in the claims and mentioned in the description can each be essential to the invention individually or in arbitrary combination.] drawings, in which:

[Drawing]

[Shown in the drawing are:]

Fig. 1[, the view of a section] is a sectional view through a contact protection housing of the invention, in the empty state;

Fig. 2[,] shows the contact protection housing of Fig. 1 in the filled state;

Fig. 3[, the view of] is a section along the line III-III [in] of Fig. 1; and

Fig. 4[,] is an enlarged detail of the contact protection housing shown in Fig. 3.

Page 6, of the specification:

[Description of the Exemplary Embodiment] DESCRIPTION OF THE PREFERRED EMBODIMENT

In Fig. 1, a magnet valve 1 is shown, which with the aid of a hollow clamping screw (not shown) is mounted on a distributor injection pump (also not shown). A line holder 2 is mounted on the magnet valve 1. The line holder 2 includes a fixation

aid 3, which has a substantially triangular outer contour. The line holder 2 and the fixation aid 3 serve to receive electrical lines 4. The electrical lines 4 are disposed in the line holder 2 in such a way that they are positioned with the least possible spacing on the contact lugs 5 that originate at the magnet valve 1. The line holder 2 is secured to the magnet valve 1 with the aid of a screw 6.

The connection points of the magnet valve 1 are surrounded by a cap 7, in which an opening 8 is made. The opening 8 in the cap 7 serves to [fill] enable filling of the hollow interior 9 of the cap 7, which is also known as a cavity, with a potting composition.

In Fig. 2, the cavity 9 is filled with potting composition. The introduction of the potting composition is done through a nozzle 10. Between the nozzle 10 and the cap 7 of the contact protection housing of the invention, there is an adapter 14. By means of the adapter 14, the cap 7 is thermally decoupled from the nozzle 10.

Page 7, of the specification:

The adapter 14 has a central through bore with first portion 11, a second portion 12, and a third portion 13. The third portion 13 has the form of a circular cylinder and is disposed between the first portion 11 and the second portion 12. The connection can also be conical, with tapering in the direction of the nozzle, and/or profiled. The third portion 13, upon injection of the potting composition, forms a gate or spur 16, which is removed after assembly.

The second portion 12 is embodied conically and serves to receive the tip of the nozzle 10. The first portion 11 of the through bore in the adapter 14 is likewise embodied conically. The two cones in the portions 11 and 12 of the adapter 14 both taper toward the middle portion 13, which has the smallest diameter of the three portions.

In the interior of the first portion 11, the potting composition forms a button 15. The button 15 has an outside diameter that is greater than [inside] diameter of the bore 8 in the cap 7.

In Fig. 3, it can be seen that the cap 7 has a cylindrical outer contour 20, on which a generally triangular protrusion is formed whose flanks are identified by reference numerals 21 and 22. The tip of the protrusion is embodied in flattened fashion.

Page 10, of the specification:

The clamping screw (not shown) of the magnet valve 1 is caught under the covering cap 7, since the covering cap 7 has radially larger dimensions than the magnet valve 1. It is impossible to remove the covering cap 7 without causing mechanical damage.

The foregoing relates to preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

Page 13, abstract of the disclosure:

Abstract of the Disclosure

[The invention relates to a] A contact protection housing for at least one electrical terminal that is disposed in a housing part [(7) which is] mounted on a component [(1)] and in which an opening [(8)] for introducing potting composition is made. The invention also relates to an injection pump, having a contact protection housing as described above, and to a method for mounting a contact protection housing, with an adapter. [To reduce the effort and expense of assembly, the] The housing part is formed by a thin-walled cap [(7)], whose edge rests constantly on the component [(1)] by initial tension.

[Fig. 2]

IN THE ABSTRACT

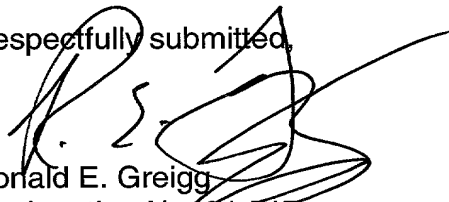
Please substitute the attached Abstract of the Disclosure for the abstract as originally filed.

REMARKS

The above amendments are being made to place the application in better condition for examination.

Entry of the amendment is respectfully solicited.

Respectfully submitted,



Ronald E. Greigg
Registration No. 31,517
Attorney for Applicant
Customer No. 002119

Greigg & Greigg P.L.L.C.
1423 Powhatan Street, Unit One
Alexandria, Virginia 22314
Telephone: (703) 838-5500
Facsimile: (703) 838-5554

09914566-1201

APPENDIX 2
NEW PAGES 1, 2, 3, 5, 6, 7, 10 AND 13
OF THE SPECIFICATION:

108721 9954660

CONTACT PROTECTION HOUSING, INJECTION PUMP, AND METHOD FOR
MOUNTING A CONTACT PROTECTION HOUSING WITH THE AID OF AN
ADAPTER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a 35 USC 371 application of PCT/DE 00/04099 filed on
November 21, 2000.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a contact protection housing for at least one electrical
terminal that is disposed in a housing part which is mounted on a component and in
which an opening for introducing potting composition is made. The invention also
relates to an injection pump, having a contact protection housing as described
above. The invention also relates to a method for mounting a contact protection
housing, with an adapter.

DESCRIPTION OF THE PRIOR ART

German Patent Disclosure DE 197 03 686 discloses a contact protection
housing which comprises two assembled housing parts. There is a seal between
the two housing parts. The seal holds back potting composition that has not yet set
during filling. The seal must be positioned precisely when the contact protection
housing is put together. Furthermore, the seal is vulnerable to wear.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to furnish a contact protection housing which is
formed of fewer individual parts than conventional contact protection housings. The
effort and expense of assembly should also be reduced.

In a contact protection housing for at least one electrical terminal that is disposed in a housing part which is mounted on a component and in which an opening for introducing potting composition is made, this object is attained in that the housing part is formed by a thin-walled cap, whose edge rests constantly on the component by initial tension. This offers the advantage that the seal required in conventional contact protection housings can be omitted.

A particular embodiment of the contact protection housing of the invention is characterized in that the cap takes the form of a cylinder, open on one face end, on whose jacket face a protrusion tapering to a sharp point is provided, the flanks of which protrusion are embodied as slightly concave. The concave embodiment brings about an elastic adaptation of the flanks of the cap to the component. As a result, production-dictated tolerances of the component can be compensated for. Venting the cavity during the potting takes place automatically via the remaining slight gaps between the line holder and a magnet valve with which it is used.

In an injection pump, in particular a distributor injection pump, for motor vehicles, on which pump a magnet valve is secured with the aid of a hollow clamping screw, the

above-stated objected is attained by a contact protection housing whose protrusion protrudes past the circumference or inside diameter of the hollow clamping screw. As a result, in the mounted state, an undesired dismantling of the magnet valve is reliably prevented.

In the use of the cap of the invention, quality problems in the region of the gate have occurred at high fill nozzle temperatures. It is therefore a further object of the invention to disclose a fast mounting method in which even at high fill nozzle temperatures, damage to the potting composition is averted.

In a method for mounting a contact protection housing as described above on a component, in particular on an injection pump as described above, in which the potting composition is introduced with the aid of a nozzle, this object is attained in that while the potting composition is being introduced, there is an adapter disposed between the cap and the nozzle. The adapter part separates the nozzle from the cavity. The spacing, forced by the adapter part, between the cap and the nozzle prevents thermal destruction of the potting composition in the region of the fill opening in the cap.

An adapter for the use of the method described above is characterized in that the adapter has a through bore with a first portion, whose diameter is larger than the diameter of the opening in the cap for introducing the potting

depends, among other factors, on the temperature of the nozzle in the introduction process.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages, characteristics and details of the invention will become apparent from the ensuing description, in conjunction with the drawings, in which:

Fig. 1 is a sectional view through a contact protection housing of the invention, in the empty state;

Fig. 2 shows the contact protection housing of Fig. 1 in the filled state;

Fig. 3 is a section along the line III-III of Fig. 1; and

Fig. 4 is an enlarged detail of the contact protection housing shown in Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In Fig. 1, a magnet valve 1 is shown, which with the aid of a hollow clamping screw (not shown) is mounted on a distributor injection pump (also not shown). A line holder 2 is mounted on the magnet valve 1. The line holder 2 includes a fixation aid 3, which has a substantially triangular outer contour. The line holder 2 and the fixation aid 3 serve to receive electrical lines 4. The electrical lines 4 are disposed in the line holder 2 in such a way that they are positioned with the least possible spacing on the contact lugs 5 that originate at the magnet valve 1. The line holder 2 is secured to the magnet valve 1 with the aid of a screw 6.

The connection points of the magnet valve 1 are surrounded by a cap 7, in which an opening 8 is made. The opening 8 in the cap 7 serves to enable filling of the hollow interior 9 of the cap 7, which is also known as a cavity, with a potting composition.

In Fig. 2, the cavity 9 is filled with potting composition. The introduction of the potting composition is done through a nozzle 10. Between the nozzle 10 and the cap 7 of the contact protection housing of the invention, there is an adapter 14. By means of the adapter 14, the cap 7 is thermally decoupled from the nozzle 10.

The adapter 14 has a central through bore with first portion 11, a second portion 12, and a third portion 13. The third portion 13 has the form of a circular cylinder and is disposed between the first portion 11 and the second portion 12. The connection can also be conical, with tapering in the direction of the nozzle, and/or profiled. The third portion 13, upon injection of the potting composition, forms a gate or spur 16, which is removed after assembly.

The second portion 12 is embodied conically and serves to receive the tip of the nozzle 10. The first portion 11 of the through bore in the adapter 14 is likewise embodied conically. The two cones in the portions 11 and 12 of the adapter 14 both taper toward the middle portion 13, which has the smallest diameter of the three portions.

In the interior of the first portion 11, the potting composition forms a button 15. The button 15 has an outside diameter that is greater than diameter of the bore 8 in the cap 7.

In Fig. 3, it can be seen that the cap 7 has a cylindrical outer contour 20, on which a generally triangular protrusion is formed whose flanks are identified by reference numerals 21 and 22. The tip of the protrusion is embodied in flattened fashion.

While the potting composition is being introduced, the cap 7 is held down with the adapter 14. A visible bulge 15, also known as a button, is preserved in the gate region. The button creates a positive engagement, for the sake of axially fixing the cap 7, that reinforces the frictional engagement after the cap is pressed on. By the adhesion of the potting composition to the cap 7, the cap is additionally retained and vibration-damped. Further tasks of the potting composition are securing the fastening screw 6 of the line holder 2, insulating the contacts from one another and from ground, protecting the contacts against media, and filling up small voids and undercuts in order to prevent suction.

By means of the version according to the invention, not only the advantages of mounting the magnet valve 1 to the pump without a trailing cable, and the well-known high functional safety of trailing cable contacting in operation can be exploited. The construction according to the invention can be used in small component assemblies and in already-complete products. The requisite mounting steps can be integrated within a short-cycle line assembly process.

The clamping screw (not shown) of the magnet valve 1 is caught under the covering cap 7, since the covering cap 7 has radially larger dimensions than the magnet valve 1. It is impossible to remove the covering cap 7 without causing mechanical damage.

The clamping screw (not shown) of the magnet valve 1 is caught under the covering cap 7, since the covering cap 7 has radially larger dimensions than the magnet valve 1. It is impossible to remove the covering cap 7 without causing mechanical damage.

The foregoing relates to preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

Abstract of the Disclosure

A contact protection housing for at least one electrical terminal that is disposed in a housing part mounted on a component and in which an opening for introducing potting composition is made. The invention also relates to an injection pump, having a contact protection housing as described above, and to a method for mounting a contact protection housing, with an adapter. The housing part is formed by a thin-walled cap, whose edge rests constantly on the component by initial tension.

2/pts

CONTACT PROTECTION HOUSING, INJECTION PUMP, AND METHOD FOR
MOUNTING A CONTACT PROTECTION HOUSING WITH THE AID OF AN
ADAPTER

Prior Art

5 The invention relates to a contact protection housing for
at least one electrical terminal that is disposed in a housing
part which is mounted on a component and in which an opening
for introducing potting composition is made. The invention
also relates to an injection pump, having a contact protection
10 housing as described above. The invention also relates to a
method for mounting a contact protection housing, with an
adapter.

15 From German Patent Disclosure DE 197 03 686, a contact
protection housing is known which comprises two put-together
housing parts. There is a seal between the two housing parts.
The seal holds back potting composition that has not yet set
during filling. The seal must be positioned precisely when
the contact protection housing is put together. Furthermore,
the seal is vulnerable to wear.

20 It is an object of the invention to furnish a contact
protection housing which is formed of fewer individual parts
than conventional contact protection housings. The effort and
expense of assembly should also be reduced.

above-stated objected is attained by a contact protection housing of claim 2, whose protrusion protrudes past the circumference or inside diameter of the hollow clamping screw. As a result, in the mounted state, an undesired dismantling of the magnet valve is reliably prevented.

In the use of the cap of the invention, quality problems in the region of the gate have occurred at high fill nozzle temperatures. It is therefore a further object of the invention to disclose a fast mounting method in which even at high fill nozzle temperatures, damage to the potting composition is averted.

In a method for mounting a contact protection housing as described above on a component, in particular on an injection pump as described above, in which the potting composition is introduced with the aid of a nozzle, this object is attained in that while the potting composition is being introduced, there is an adapter disposed between the cap and the nozzle. The adapter part separates the nozzle from the cavity. The spacing, forced by the adapter part, between the cap and the nozzle prevents thermal destruction of the potting composition in the region of the fill opening in the cap.

An adapter for the use of the method described above is characterized in that the adapter has a through bore with a first portion, whose diameter is larger than the diameter of the opening in the cap for introducing the potting

composition, and having a conical second portion, which tapers from the inside outward. The first portion serves to compensate for imprecisions in attaching the nozzle to the cap. As a result, perfect filling of the cap is also assured even if the nozzle opening is not disposed precisely concentrically with the cap opening. The forming composition remaining outside the cap in the region of the cap opening after the filling operation forms a button, which is integral with the forming composition in the interior of the cap. The button has a larger diameter than the opening in the cap and as a result prevents detachment and undesired removal of the cap after mounting. The conical second portion of the adapter serves to seal off the fill nozzle and center it.

A particular type of embodiment of the adapter of the invention is characterized in that the first portion tapers from the inside outward. This assures good unmolding once the potting composition has been introduced into the cap.

A further embodiment of the adapter of the invention is characterized in that a cylindrical third portion is disposed between the first portion and the second portion. The connection can also be conical, with tapering in the direction of the nozzle, and/or can be profiled. The third portion allows the potting composition to pass through in the introduction process. Via the length of the third portion, the spacing between the nozzle and the cap can be varied. The magnitude of the spacing between the nozzle and the cap

depends, among other factors, on the temperature of the nozzle in the introduction process.

Further advantages, characteristics and details of the invention will become apparent from the ensuing description, in which one exemplary embodiment of the invention is described in detail in conjunction with the drawing. The characteristics recited in the claims and mentioned in the description can each be essential to the invention individually or in arbitrary combination.

Drawing

Shown in the drawing are:

Fig. 1, the view of a section through a contact protection housing of the invention, in the empty state;

Fig. 2, the contact protection housing of Fig. 1 in the filled state;

Fig. 3, the view of a section along the line III-III in Fig. 1; and

Fig. 4, an enlarged detail of the contact protection housing shown in Fig. 3.

Description of the Exemplary Embodiment

In Fig. 1, a magnet valve 1 is shown, which with the aid of a hollow clamping screw (not shown) is mounted on a distributor injection pump (also not shown). A line holder 2 is mounted on the magnet valve 1. The line holder 2 includes a fixation aid 3, which has a substantially triangular outer contour. The line holder 2 and the fixation aid 3 serve to receive electrical lines 4. The electrical lines 4 are disposed in the line holder 2 in such a way that they are positioned with the least possible spacing on the contact lugs 5 that originate at the magnet valve 1. The line holder 2 is secured to the magnet valve 1 with the aid of a screw 6.

The connection points of the magnet valve 1 are surrounded by a cap 7, in which an opening 8 is made. The opening 8 in the cap 7 serves to fill the hollow interior 9 of the cap 7, which is also known as a cavity, with a potting composition.

In Fig. 2, the cavity 9 is filled with potting composition. The introduction of the potting composition is done through a nozzle 10. Between the nozzle 10 and the cap 7 of the contact protection housing of the invention, there is an adapter 14. By means of the adapter 14, the cap 7 is thermally decoupled from the nozzle 10.

5 The adapter 14 has a central through bore with first portion 11, a second portion 12, and a third portion 13. The third portion 13 has the form of a circular cylinder and is disposed between the first portion 11 and the second portion 12. The connection can also be conical, with tapering in the direction of the nozzle, and/or profiled. The third portion 13, upon injection of the potting composition, forms a gate 16, which is removed after assembly.

10 The second portion 12 is embodied conically and serves to receive the tip of the nozzle 10. The first portion 11 of the through bore in the adapter 14 is likewise embodied conically. The two cones in the portions 11 and 12 of the adapter 14 both taper toward the middle portion 13, which has the smallest diameter of the three portions.

15 In the interior of the first portion 11, the potting composition forms a button 15. The button 15 has an outside diameter that is greater than inside diameter of the bore 8 in the cap 7.

20 In Fig. 3, it can be seen that the cap 7 has a cylindrical outer contour 20, on which a triangular protrusion is formed whose flanks are identified by reference numerals 21 and 22. The tip of the protrusion is embodied in flattened fashion.

In Fig. 4, the region of the flank 21 of the cap 7 of Fig. 3 is shown enlarged. The flank 21 of the cap 7, in the built-in state, rests on the housing of the magnet valve 1. It is indicated at 23 that the flank 21 of the cap 7, in the non-built-in state, is embodied as slightly concave, that is, as bulging inward.

For the sake of high-pressure sealing, the magnet valve 1 must be secured to the distributor injection pump with the aid of the concentrically disposed hollow clamping screw, with a high tightening torque. A trailing cable on the magnet valve 1 would be extremely vulnerable to being damaged. The magnet valve 1 therefore has only two protruding contact lugs 5 for the sake of later contacting. Because of the stringent demands made of it in operation, the contacting means should be embodied inseparably. It must be protected against mechanical stress and against media. All the work operations for contacting purposes must be capable of being executed within a predetermined, short assembly cycle. All of these specifications are met by the invention. The assembly of the contact protection housing of the invention proceeds as follows.

First, the magnet valve 1 is screwed to the distributor injection pump (not shown). Then the line holder 2, with the electrical lines 4, is slipped onto the exposed face end of the magnet valve 1. In the process, the two contact lugs 5 of the magnet valve 1 are passed through appropriate openings

into the line holder 2. The cable ends of the electrical lines 4 are disposed and fixed in such a way that they are always at a slight spacing from the contact lugs 5.

Next, with the aid of the screw 6, the line holder 2 is screwed to the magnet valve 1. After that, the contacting between the cable ends of the electrical lines 4 and the contact lugs 5 is effected by resistance welding. Soldering or other welding processes are also possible.

In the next step, the covering cap 7 is pressed onto the magnet valve 1 and the line holder 2, until its bottom comes into contact with the line holder 2. The covering cap 7 is embodied such that the edge of the cap rests constantly with initial tension on the magnet valve 1 and on the hump-shaped fixation aid 3. As a result, when the potting composition is then introduced, sealing without an additional sealing element is achieved.

The cavity 9 in the interior of the cap 7 is filled up with potting composition. Hot melt adhesive, which is introduced with overpressure, is used as the potting composition. Hot melt adhesive offers the advantage of not requiring any additional importation of heat or a long reaction time at room temperature. However, within the scope of the present invention, other potting compositions can be used instead.

While the potting composition is being introduced, the cap 7 is held down with the adapter 14. A visible bulge 15, also known as a button, is preserved in the gate region. The button creates a positive engagement, for the sake of axially fixing the cap 7, that reinforces the frictional engagement after the cap is pressed on. By the adhesion of the potting composition to the cap 7, the cap is additionally retained and vibration-damped. Further tasks of the potting composition are securing the fastening screw 6 of the line holder 2, insulating the contacts from one another and from ground, protecting the contacts against media, and filling up small voids and undercuts in order to prevent suction.

By means of the version according to the invention, not only the advantages of mounting the magnet valve 1 to the pump without a trailing cable, and the well-known high functional safety of trailing cable contacting in operation can be exploited. The construction according to the invention can be used in small component assemblies and in already-complete products. The requisite mounting steps can be integrated within a short-cycle line assembly process.

The clamping screw (not shown) of the magnet valve 1 is caught under the covering cap 7, since the covering cap 7 has radially larger dimensions than the magnet valve 1. It is impossible to remove the covering cap 7 without causing mechanical damage.

Claims

1. A contact protection housing for at least one electrical terminal that is disposed in a housing part (7) which is mounted on a component (1) and in which an opening (8) for introducing potting composition is made, characterized in that the housing part is formed by a thin-walled cap (7), whose edge rests constantly on the component (1) by initial tension.
2. The contact protection housing of claim 1, characterized in that the cap (7) takes the form of a cylinder (20), open on one face end, on whose jacket face a protrusion tapering to a sharp point is provided, the flanks (21, 22) of which protrusion are embodied as slightly concave.
3. A fuel injection pump, in particular a distributor injection pump, for motor vehicles, on which pump a magnet valve (1) is secured with the aid of a hollow clamping screw, characterized by a contact protection housing of claim 2, whose protrusion protrudes past the inside diameter of the hollow clamping screw.
4. A method for mounting a contact protection housing of claim 1 or 2 on a component, in particular on an injection pump of claim 3, in which the potting composition is introduced with the aid of a nozzle (10), characterized in that while the potting composition is being introduced, there

is an adapter (14) disposed between the cap (7) and the nozzle (10).

5. An adapter for the use of the method of claim 4, characterized in that the adapter (14) has a through bore with a first portion (11), whose diameter is larger than the diameter of the opening (8) in the cap (7) for introducing the potting composition, and having a conical second portion (12), which tapers from the inside outward.

6. The adapter of claim 5, characterized in that the first portion (11) tapers from the inside outward.

7. The adapter of claim 5 or 6, characterized in that a cylindrical third portion (13) is disposed between the first portion (11) and the second portion (12).

1 / 2

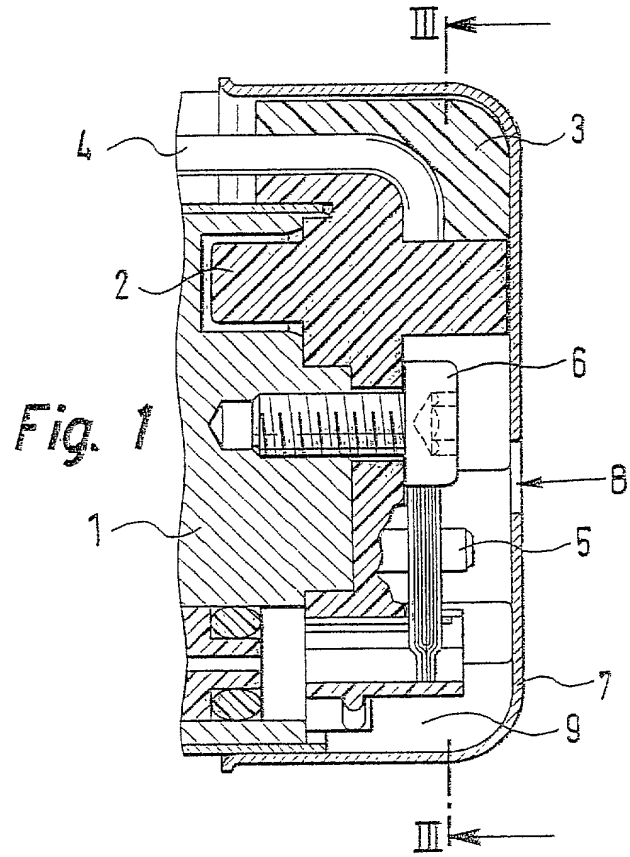


Fig. 2

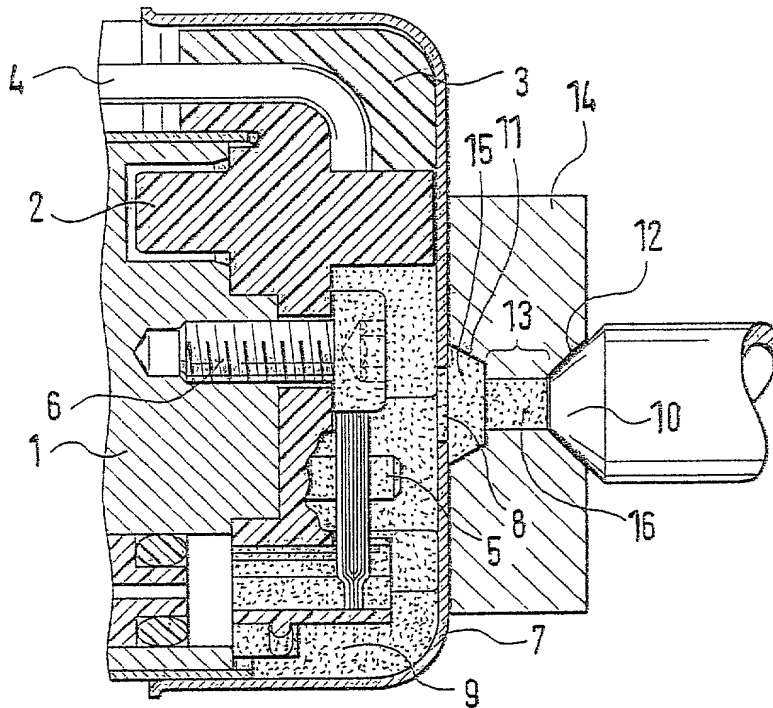


Fig. 3

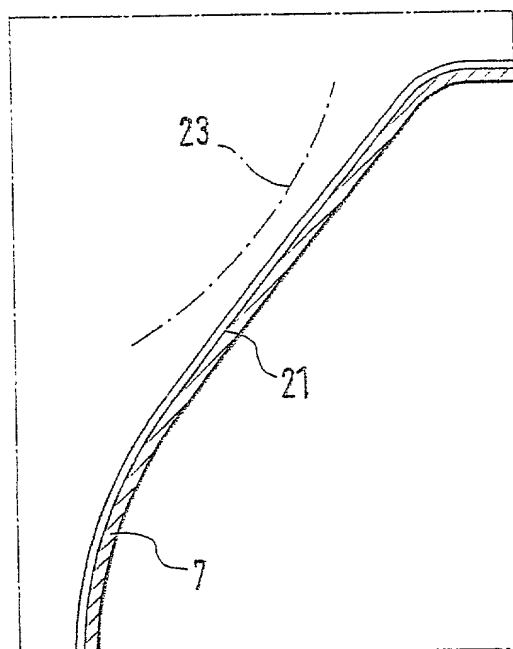
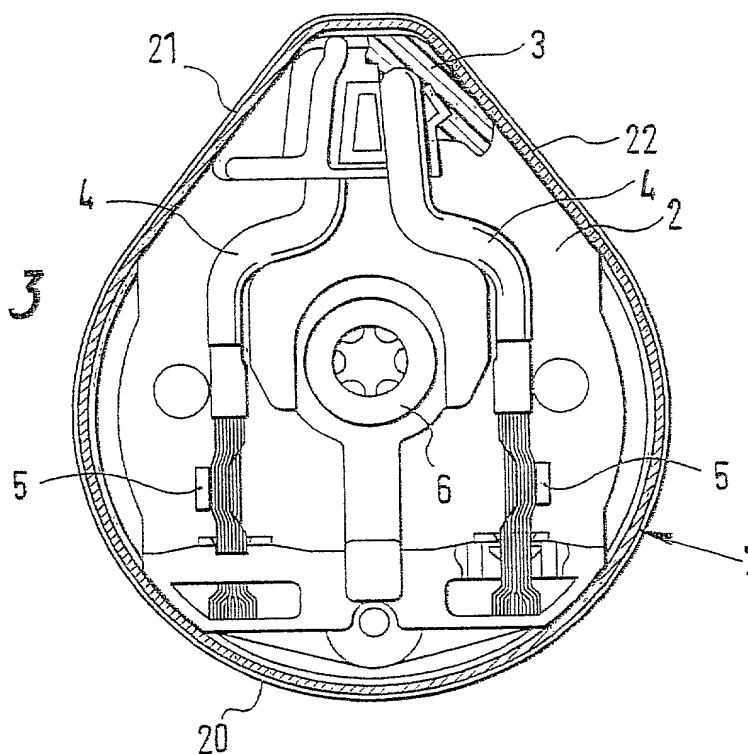


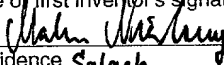
Fig. 4

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Ronald E. Greigg - Registration No. 31,517

Send Correspondence to: Ronald E. Greigg
Greigg & Greigg P.L.L.C.
1423 Powhatan Street, Unit One
Alexandria, Virginia 22314

Direct Telephone Calls to: *(name and telephone number)*
Ronald E. Greigg - (703) 838-5500/Telephone - (703) 838-5554/Facsimile

Full name of sole or first inventor <u>Markus NIESLONY</u>	
Sole or first inventor's signature 	Date <u>17.10.2004</u>
Residence <u>Salach</u> <u>73084 Haslach, Germany DEX</u>	
Citizenship <u>Deutsch</u>	
Post Office Address <u>Schulstr. 12/1</u> <u>Salach</u> <u>73084 Haslach, Germany</u>	

Full name of second inventor, if any	
Second inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Docket No.

R.35956

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**CONTACT PROTECTION HOUSING, INJECTION PUMP, AND METHOD FOR MOUNTING A
CONTACT PROTECTION HOUSING WITH THE AID OF AN ADAPTER**

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 21 NOVEMBER 2000 as United States Application No. or PCT International
Application Number PCT/DE 00/04099
and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)	Priority	Claimed
<u>1 99 63 933.7</u> (Number)	<u>GERMANY</u> (Country)	<u>31 DECEMBER 1999</u> (Day/Month/Year Filed)
		<input checked="" type="checkbox"/>
<u> </u> (Number)	<u> </u> (Country)	<u> </u> (Day/Month/Year Filed)
		<input type="checkbox"/>
<u> </u> (Number)	<u> </u> (Country)	<u> </u> (Day/Month/Year Filed)
		<input type="checkbox"/>

Docket No. R.35956